



ELECTRIC TRANSMISSION 301: Gas/Electric Coordination in New England

Anne George

***Vice President, External Affairs & Corporate
Communications***



Presentation Outline



Current
Trends



And
Challenges



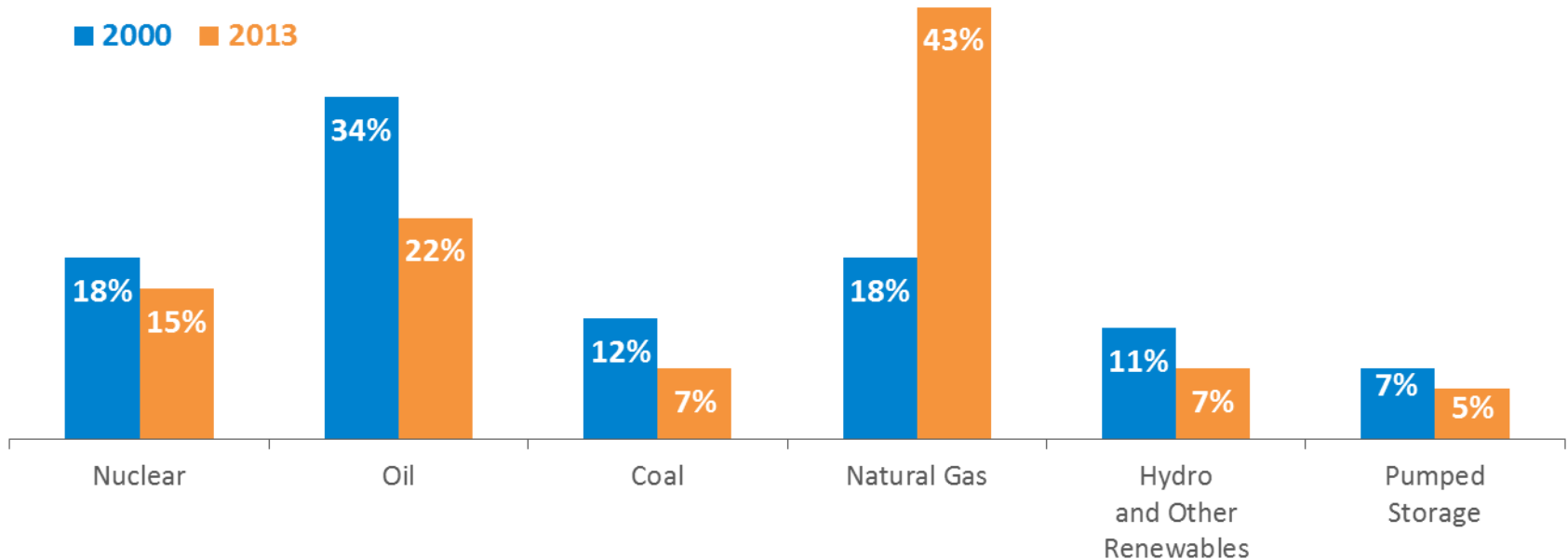
Addressing
Challenges

- Fleet in transition
 - Significant amount of natural gas generation added and more proposed
 - Price volatility associated with dependence on natural gas
 - Unavailability of natural gas creates reliability risks
 - Transmission and natural gas pipeline infrastructure needed
- Market rule improvements
 - Federal policies seeking to better align natural gas day with electricity day
 - Regional cooperation aimed at developing infrastructure

Dramatic Changes in Power System Resources

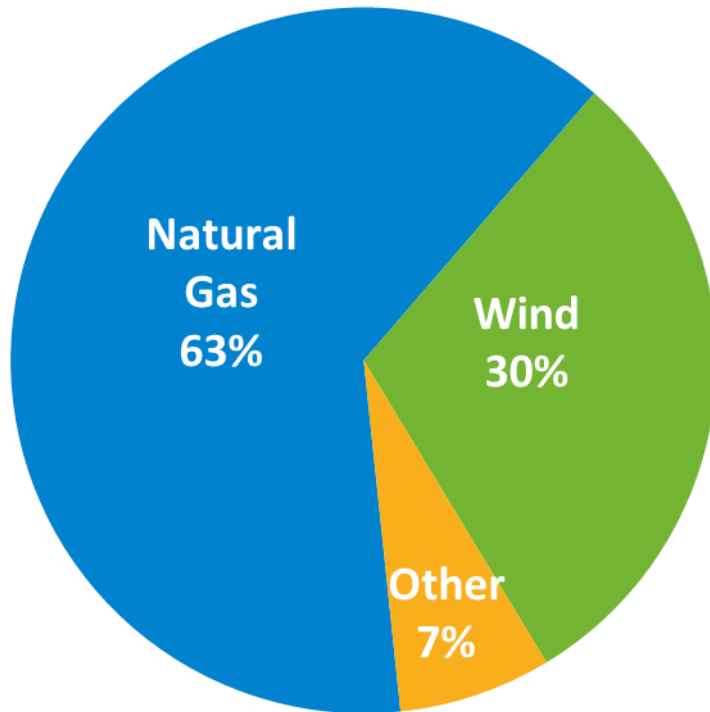
The resources making up the region's installed generating capacity have shifted from nuclear, oil and coal to natural gas

Percent of Total System **Capacity** by Fuel Type
(2000 vs. 2013)



Significant Amounts of Natural Gas Proposed

Proposed Generation

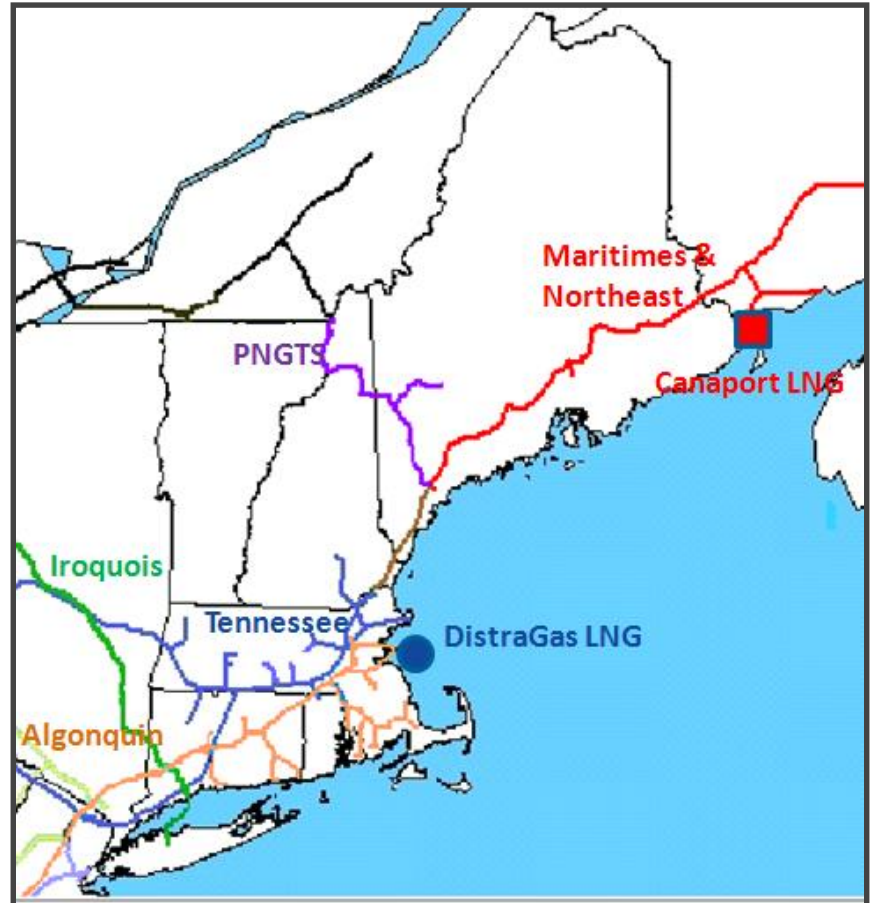


- Over 4 GW of natural gas proposed to be developed in the region over the next half dozen years
- The addition of more gas can exacerbate region's dependence and challenges associated with price volatility and reliability

New England's Natural Gas Transmission System

Region has limited natural gas storage potential and additional infrastructure can help region better access natural gas supply in neighboring regions

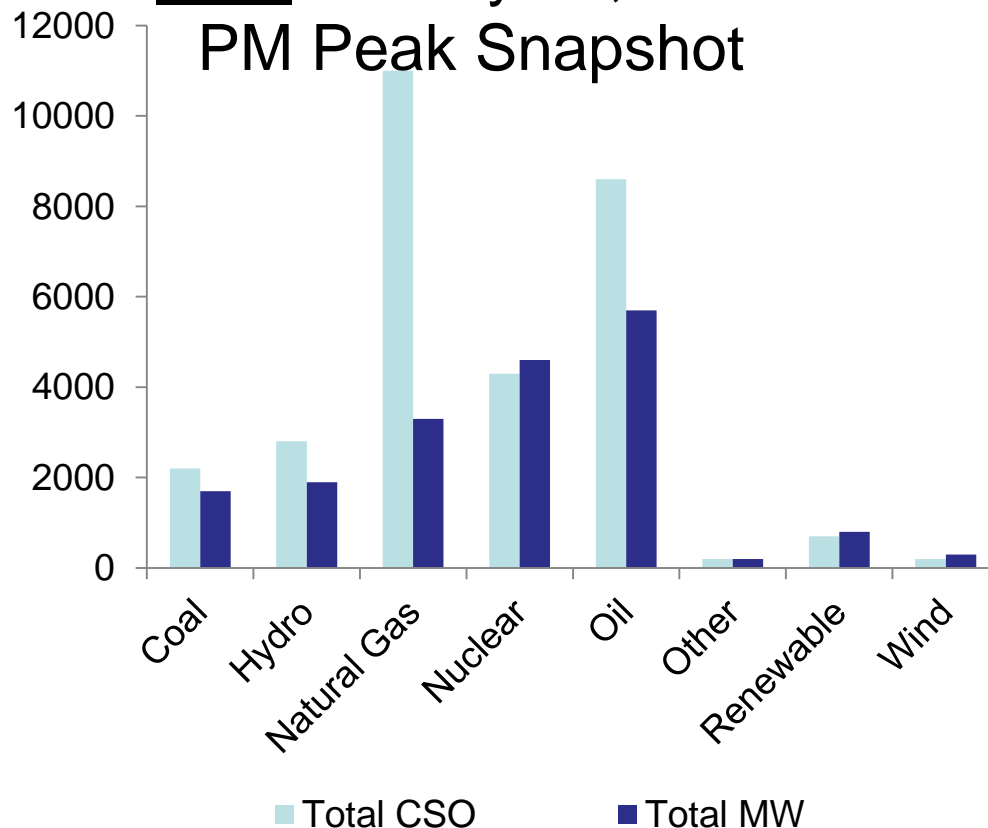
- 5 gas pipelines
- 2 LNG storage facilities
 - Dstrigas 3.4 Bcf
 - Canaport 9.9 Bcf
- Amount of gas-fired generation on each facility
 - Algonquin: 8,859 MW
 - Dstrigas: 1,694 MW
 - Iroquois: 1,472 MW
 - M&N: 2,200 MW
 - PNGTS: 436 MW
 - Tennessee: 3,851 MW



Limited Gas in Winter Impacts Generator Availability

Total MW Generated vs. CSO by Fuel

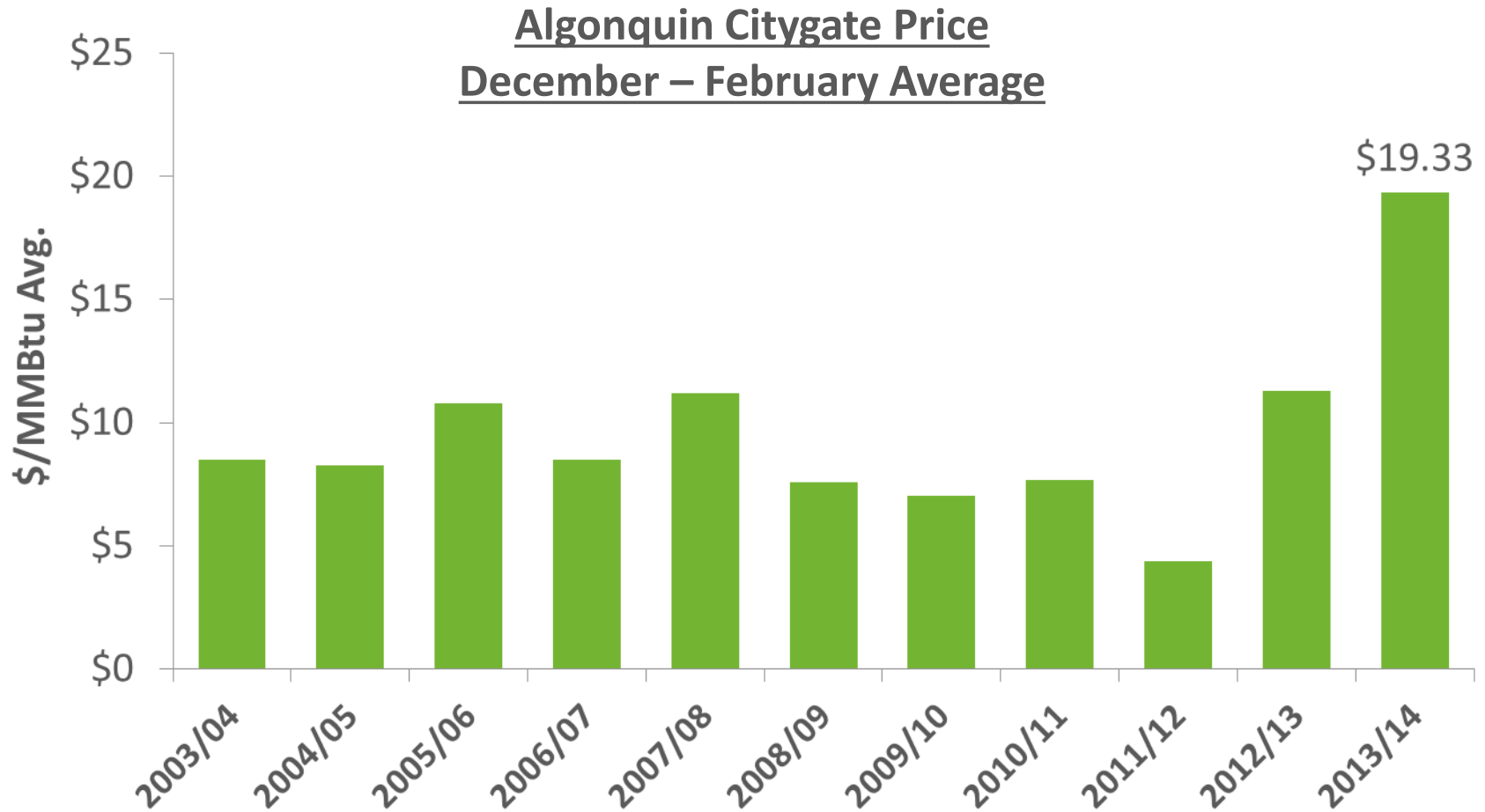
Type January 28, 2014
PM Peak Snapshot



While oil provided more energy than in recent years, and other non-gas generators neared their capacity limits, gas produced far less than capacity

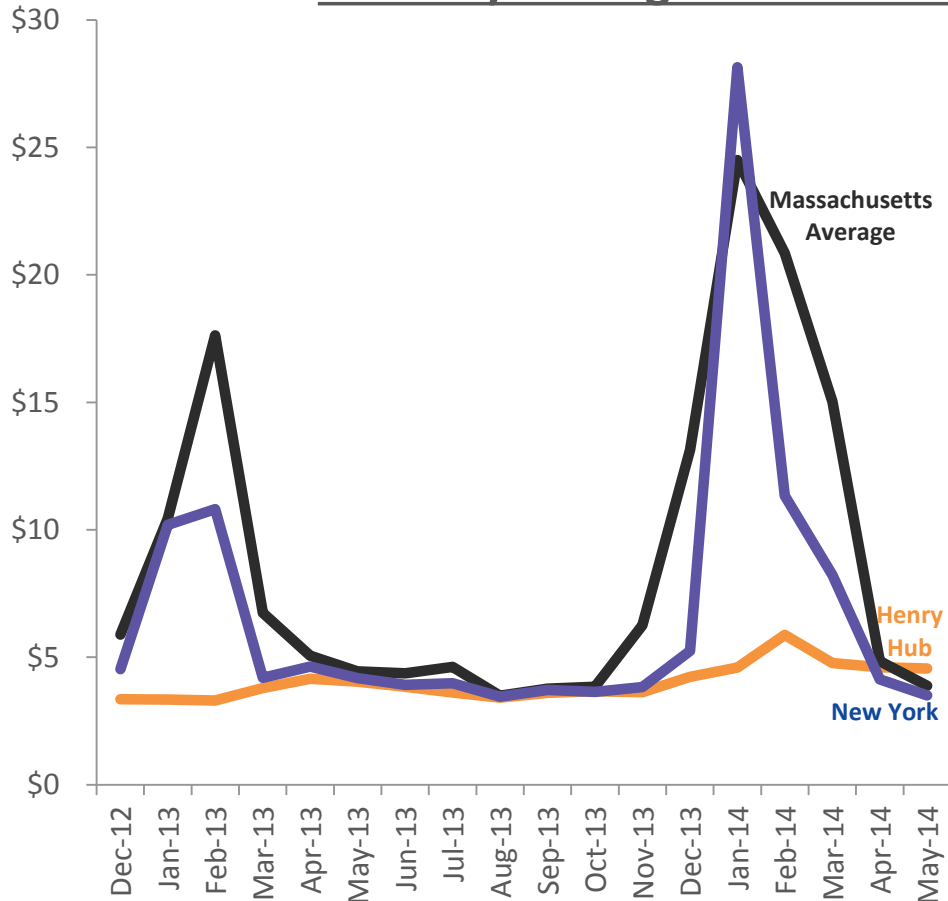
For example, on January 28, 2014, of the more than 11,000 MW of gas-fired generation with a capacity supply obligation, about 3,000 MW were generating during the peak hour

Winter Gas Prices Nearly Doubled in a Year



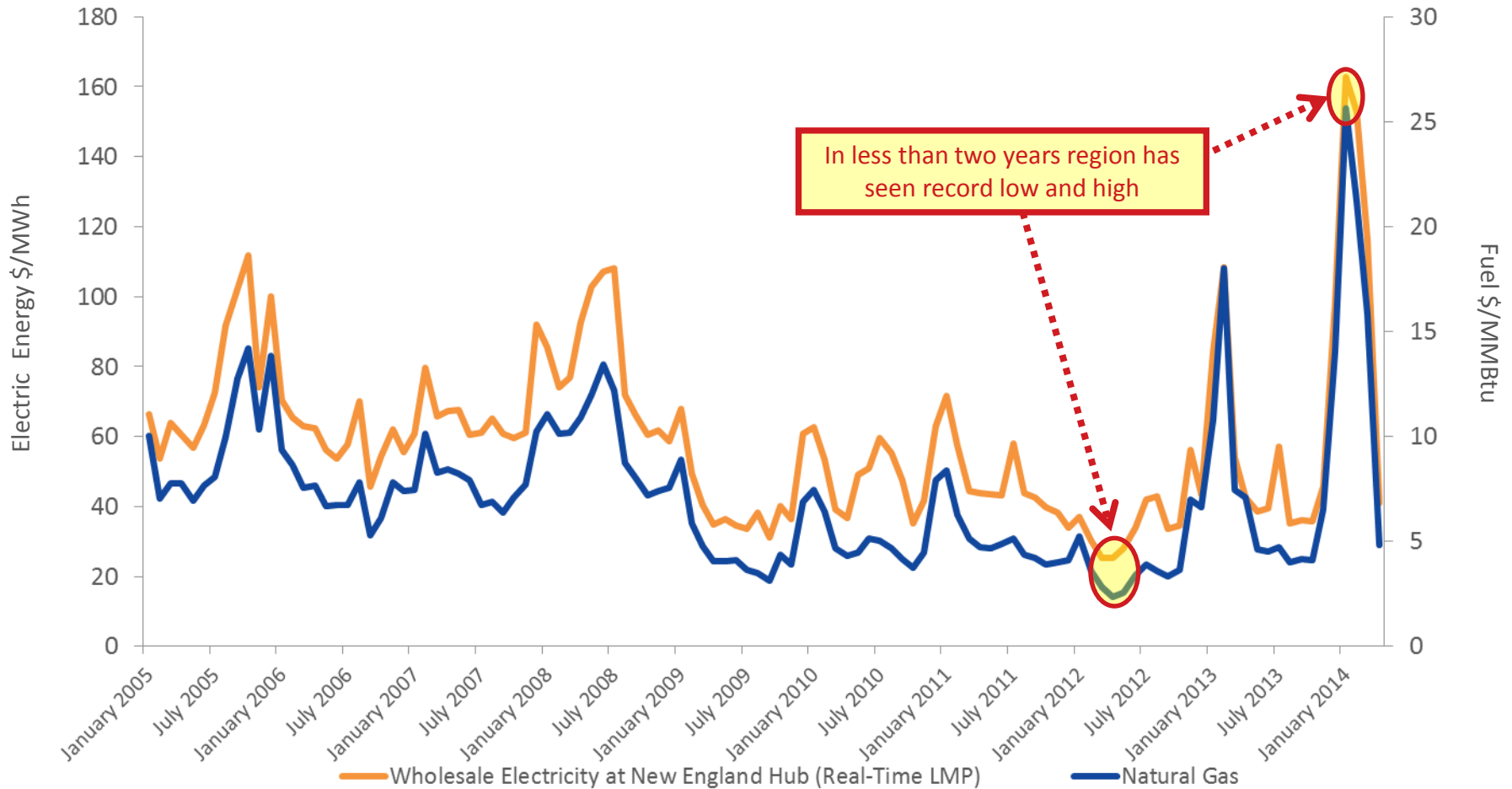
Natural Gas Prices High Relative to Other Regions

Monthly Average Natural Gas Prices \$/MMBtu



<u>Winter Monthly Gas Differentials</u>					
Winter natural gas prices in New England generally higher than New York and much higher than Henry Hub					
Month	Henry Hub	MASS Avg.	New York	NY vs. MA Avg.	Henry Hub vs. MA Avg.
Dec-12	\$3.35	\$5.89	\$4.54	(\$1.35)	(\$2.54)
Jan-13	\$3.34	\$10.45	\$10.20	(\$0.25)	(\$7.11)
Feb-13	\$3.30	\$17.63	\$10.81	(\$6.82)	(\$14.33)
Dec-13	\$4.23	\$13.13	\$5.25	(\$7.88)	(\$8.90)
Jan-14	\$4.60	\$24.50	\$28.15	\$3.65	(\$19.90)
Feb-14	\$5.88	\$20.85	\$11.34	(\$9.51)	(\$14.97)

Gas Volatility Impacts Wholesale Electricity Prices



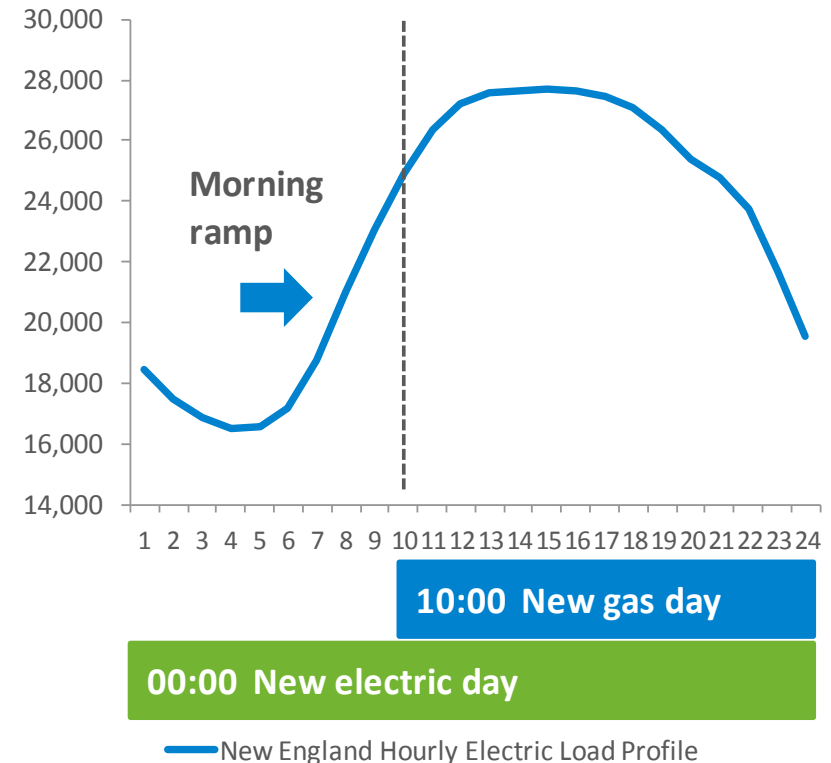
Many Units Have Announced They Will Retire and More At-Risk in Coming Years



- A few years ago ISO identified 28 units at-risk of retiring
 - Representing 8,300 MW of older oil and coal resources that will be over 40 years old in 2020
- Over 3,000 MW of generation have recently informed ISO they plan to retire
 - Salem Harbor (2014)
 - Norwalk Harbor (2017)
 - Brayton Point (2017)
- Vermont Yankee Nuclear power plant also announced retirement (2014)

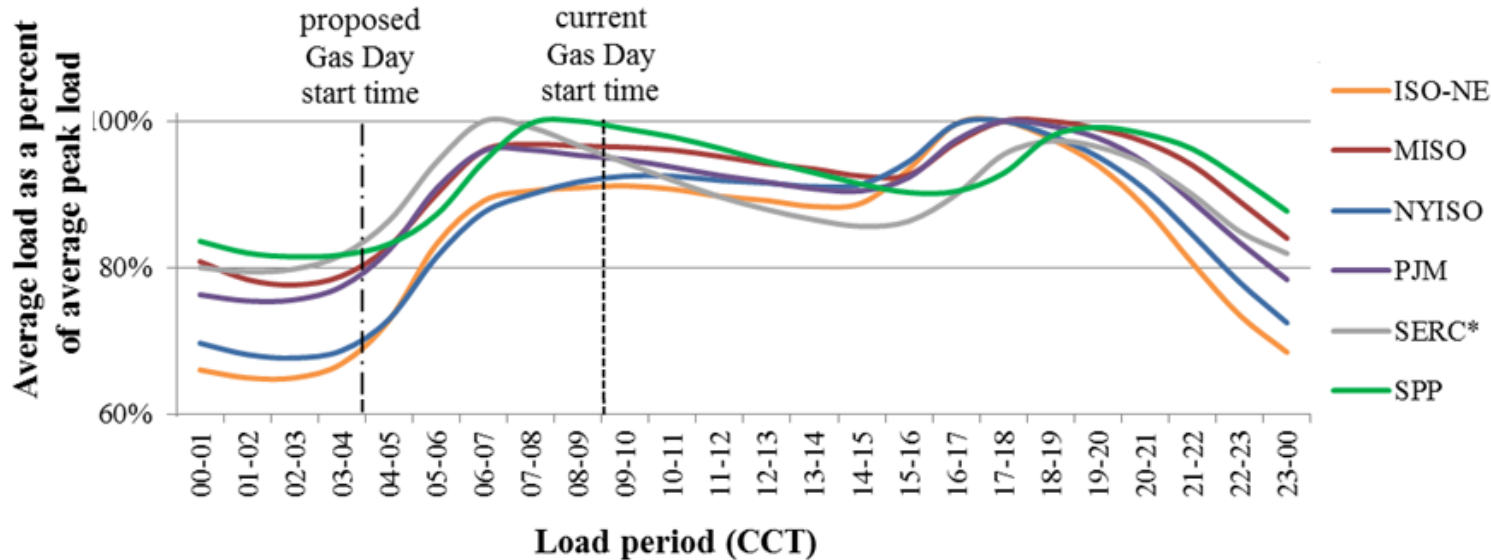
Gas and Electric Markets are Not Aligned

- Different operating days make it difficult for gas-fired generators to satisfy scheduling in both markets
- Some gas units needed for the electric system's morning ramp can't get gas until the new gas day starts (at 10 AM)
- New England moved day-ahead timing to give natural gas generators time to secure fuel and the ISO more time to secure resource adequacy



National & Regional Efforts Can Improve Reliability

NAESB
Gas-Day Change
Being
Considered



- Market rule enhancements effective this December will provide greater flexibility generators to structure and modify their supply offers in the day-ahead and real-time markets

Regional Changes
Forthcoming

Three Major Capacity Market Enhancements

1. Pay for Performance
 2. Sloped demand curve
 3. Improved zonal modeling
- Problems with capacity market resolved by Pay for Performance
 - Capacity payments are poorly linked to resource performance
 - Consequences for non-performance are negligible
 - Lack of incentive for resource owners to make investments to ensure they can provide energy and reserves when needed
 - Lack of investment poses serious threats to system reliability



Pay for Performance

- Provides capacity resources with strong, economically-sound, market-based incentives to perform at times of need

- Market participants have *flexibility* to select best, least-cost way to ensure performance

- Firm-fuel arrangements
 - Short-notice and/or non-interruptible fuel supply arrangements
- Dual-fuel capability
- Fuel storage
- New technologies and innovation



New England Governors Seeking Infrastructure

- This winter, the region's Governors, through the New England States Committee on Electricity (NESCOE), requested ISO technical support and tariff filings at FERC to support their objectives to expand energy infrastructure
- **New Electric Transmission Infrastructure**
 - Enable delivery of 1,200 MW to 3,600 MW of clean energy into New England from no and/or low carbon emissions resources
- **Increased Natural Gas Capacity**
 - Increase firm pipeline capacity into New England by 1000 mmcf/day above 2013 levels, or 600 mmcf/day beyond announced projects
 - Targeted to be in-service by winter 2017/18



Conclusions

- New England has a growing reliability problem due to gas pipeline constraints and poor performance by some resources and a need to balance an increasing amount of intermittent renewable energy
- New England states are driving additional investments in behind-the-meter resources (EE, DR, and DG) in combination with grid-connected, intermittent resources (wind and solar energy)
- Capacity market incentives are necessary, but may not be sufficient, to drive pipeline investments
 - Dual fuel is currently a more economic choice for generators than firm-gas transportation
- ISO working with states relative to infrastructure development